Testimony of John J. McMackin
on behalf of
The Energy-Intensive Manufacturers' Working Group
on Greenhouse Gas Regulation

Before the House Committee on Ways and Means
Subcommittee on Trade
Hearing on
Trade Aspects of Climate Change Legislation

March 24, 2009

Mr. Chairman and members of the Subcommittee, it is an honor to be here. The Energy-Intensive Manufacturers' Working Group on Greenhouse Gas Regulation, on whose behalf I appear today, greatly appreciates this opportunity to testify on this critical issue.

I am Jack McMackin, and I am a principal in the law firm of Williams & Jensen, PLLC and a director of Owens-Illinois, Inc. O-I, headquartered in Perrysburg, Ohio and with U.S. facilities in eleven states, is the world's largest manufacturer of glass containers. O-I is a very active and committed member of the Working Group.

Solving the puzzle at the heart of today's hearing is the reason our group was formed. How can we reconcile three things that are seemingly at odds: (1) a unilateral U.S. legislative effort, that (2) addresses a global environmental problem, in light of (3) the reality of global competition? Put differently, our group is all about a solution to "the leakage problem."

I. The Energy-Intensive Manufacturers' Working Group on GHG Regulation—and "The Leakage Problem."

The Working Group was formed early last year for a narrow but important purpose: to engage constructively with other stakeholders and Congress to attempt to solve what is often referred to as "the carbon leakage problem" but what is in truth a problem both of the leakage of carbon *and* of jobs. In short, if the U.S. enacts tough global warming regulation but other key manufacturing nations do not, production of energy intensive goods may well shift to the unregulated countries, moving the associated carbon emissions beyond regulation and moving American jobs elsewhere as well.

It is a problem that primarily affects energy-intensive industries that face foreign competition—the two factors that define our members. Our group is composed of companies from the U.S. industries that are widely and correctly seen as most vulnerable to leakage: ferrous metals (iron and steel), non-ferrous metals (aluminum and copper), cement, glass (including fiberglass), ceramics, chemicals and paper. The companies

include Alcoa, Corning, Dow, Holcim(US), NewPage Corporation, Nucor, Owens Corning, Owens-Illinois, PPG, Rio Tinto, and U.S. Steel.[1]

I should mention that these are all companies that, of necessity, have already done much to increase their energy efficiency and decrease their emissions. Energy-intensive, trade-exposed industries already have a compelling economic incentive to become energy efficient, which, in turn, leads them to be carbon efficient. Energy costs are a substantial portion of these producers' manufacturing costs. Energy efficiency reduces their cost of energy, which enables them to compete more effectively.

The existence of this incentive is one of the primary reasons that, according to Energy Information Agency Data comparing 1990 emissions to those in 2005, the manufacturing sector as a whole has actually decreased its total emissions, direct and indirect, since 1990, while all other sectors are up, on average, over 30 percent. Similarly, the March 1, 2008 Public Review Draft of EPA's Inventory of Greenhouse Gas Emissions and Sinks 1990-2007 (p. ES-16), shows the industrial sector's total direct and indirect emissions down by 4.2 percent over the period. Moreover, as I will discuss in more detail later in my testimony, our work indicates that based on available data the total emissions of the 40-plus specific industrial sectors or subsectors (by six digit NAICS code) that are most exposed to leakage represent only about 8 percent of total U.S. direct emissions.

The magnitude of potential leakage is a subject of considerable recent study and wide-ranging views. Some of the estimates are truly frightening. In testimony delivered last week before the Energy and Environment Subcommittee of the Energy and Commerce Committee, Richard D. Morgenstern of Resources for the Future gave a long-term figure of 40 percent—assuming a carbon price of only $10: "Over the long term, we estimate that the leakage rate for the few most-vulnerable industries can be as high as 40 percent in the case of a unilateral $10 per ton CO2 price."[2]

There is a broad consensus that the leakage problem must be solved in any responsible global warming legislation. To fail to do so is irrational: it produces economic dislocation and job loss in exchange for no environmental benefit or, even, net environmental harm. The major question as this stage is not whether to address the problem but *how* to address it.

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[1] While this written testimony generally represents the position of the Working Group, not all statements are necessarily endorsed by every member. I do not represent members of the group other than Owens-Illinois, and while my responses to any questions during the hearing will attempt not to stray from the group's views, those responses will be my own and not necessarily the group's.

[2] Testimony of Richard D. Morgenstern, Senior Fellow, Resources for the Future, Prepared for the Committee on Energy and Commerce, U.S. House of Representatives, Hearings on Competitiveness and Climate Policy: Avoiding Leakage of Jobs and Emissions, March 18, 2009, at 5. On page 7-8 of his testimony Mr. Morgenstern cautions that the modeling done by him and his collaborators may somewhat overstate leakage because some of the trade partners it includes, such as the EU, have themselves adopted carbon regulation. However, most of these, it should be noted, such as the EU and Australia, have themselves adopted anti-leakage allowance-grant programs for their energy-intensive and trade exposed industries.

Our group's work is *focused exclusively on one type of potential solution*: the grant of free allowances to the most vulnerable manufacturers or the rebating of compliance costs to the most vulnerable manufacturers in some form (including a refundable tax credit). We have not focused, that is to say, on the import ("border equalization") or export ("export rebate") provisions that some have proposed and that the Subcommittee will also be considering. Allow me to make two points that further explain where our proposal fits in the current legislative and policy context.

1. Leakage, and our proposal to deal with it, applies equally in either cap-and-trade or carbon tax contexts.

Leakage results from any form of unilateral U.S. regulation of greenhouse gases that imposes significant costs on energy-intensive, trade-exposed U.S. industries while foreign production is not commensurately burdened. What matters is the climate-policy induced cost differential between U.S. and foreign production of competing goods; the form of the regulation causing the unilateral costs does not matter. Hence, the leakage problem exists whether Congress were to choose a cap and trade structure with its associated carbon "allowance" requirement or a carbon tax.[3] Similarly, the potential remedies to leakage are essentially the same regardless of which form (cap and trade, tax, etc.) mandatory climate policies take.

2. It is possible to divide the proposed solutions into two broad categories: (a) "cost mitigation" at the plant level which includes grants of free allowances or tax credits, and (b) "import and/or export cost-equalizing provisions."

Both of these broad categories seek to lessen the cost that would be imposed by greenhouse gas regulation on U.S. production *relative to* that of unregulated or lesser regulated countries. The first seeks to attack the differential by eliminating or mitigating the cost to U.S producers "at the source," as it were, through free allowance grants, rebates of the cost of allowances, or tax credits to the manufacturer. The second seeks to equalize the costs at the border, either by imposing comparable allowance requirements on imports or by rebating a value-added type tax on exports.

a. cost mitigation at the source

As indicated above it is the first category, cost mitigation at the source through allowance grants or allowance-value rebates or credits, upon which our efforts are exclusively focused. It is also the principal mechanism adopted by the EU and Australia to deal with the leakage problem that would otherwise be caused by their cap and trade regimes. Moreover, virtually every global warming bill introduced last year had some variation of this form of relief. Its most sophisticated form, and the one that seems to be

[3] For a discussion of the leakage problem in a carbon tax context see generally, Metcalf and Weisbach, "The Design of a Carbon Tax," Working Paper 09-05, January 2009, AEI Center for Regulatory and Market Studies (2009).

attracting the broadest support, is an "output based" grant of free allowances (or rebate of allowance value) to energy-intensive, trade-exposed manufacturers.

Output-basing was at the heart of the anti-leakage amendment authored by Senators Brown and Stabenow in Senate consideration of the Boxer substitute to the Lieberman-Warner bill, and is currently the focus of work by Congressmen Inslee and Doyle building on last year's Inslee-Doyle "Carbon Leakage Prevention Act." Last year's bill introduced by Mr. Doggett and his cosponsors, H.R. 6316, the "Climate Matters Act of 2008" contained an allowance grant provision as well as a "border equalization" provision. Moreover, Mr. Doggett, we understand, is currently considering modifying this provision to reflect Inslee-Doyle type output-basing, albeit in the context of a tax rebate or credit.

It is important to note that if a tax code mechanism is used to rebate to leakage-exposed manufacturers some or all of the cost of unilateral greenhouse gas regulation, the provision must be carefully crafted and refundable so that the solution works regardless of a firm's regular or AMT tax status. In any given year, some energy-intensive, trade-exposed industries may not owe income taxes against which a deduction or credit could be applied. Such a tax position could result from any number of factors typical of these companies: eroded revenue or margins from foreign competition and high energy costs, high depreciation from machinery and equipment investments, labor and benefits costs, asbestos-liability payments, and built-up losses and unused credits from any number of sources. If a revenue rebate is not refundable many targeted industries would receive no benefit yet would bear the cost of unilateral regulation—and outcome that does nothing to stop job and carbon leakage.

b. cost equalization at the border

The second general category has to date largely focused on imports, through "border equalization" provisions that, rather than attempt to mitigate the net cost at the level of the producer instead attempts to impose an equivalent cost on competing products as the border. The provision designed by the International Brotherhood of Electrical Engineers and American Electric Power is a prominent example. The IBEW/AEP proposal seeks to equalize the costs of imports that compete with American energy-intensive goods by imposing a special "international allowance" obligation on such imports. Mr. Doggett's bill from last year contains a parallel provision (as well as its cost-mitigating allowance grant). Likewise, the bill introduced by Mr. Larsen, America's Energy-Security Trust Fund Act, which is structured as a carbon tax, would impose a fee on imports equivalent to the tax.

Other proposals are emerging that attempt to deal with the issue of competitiveness of American exports by structuring greenhouse gas regulation as a charge similar to a value added tax and the rebating that tax on exports.[4] Note that these

[4] For a general discussion of the various forms of import and export provisions see, Fischer and Fox, "Comparing Policies to Combat Emissions Leakage: Border Tax Adjustments versus Rebates," Discussion Paper, Resources for the Future (February 2009).

provisions attempt to "equalize" the cost of American export products with their competitors in non-domestic markets. Unlike the allowance-grant or allowance-value rebates to manufacturers, these export provisions do not attempt to eliminate or mitigate the cost of regulation for energy-intensive goods in the domestic market.

While I reiterate that our Working Group's work has been solely on the first category, the cost mitigating proposals, and we do not as a group take a position on the import/export provisions, I do want to point out that the various approaches are not necessarily incompatible. It is possible to enact both types of provisions in the same legislation, and indeed most of the legislation introduced to date has had both grants of free allowances and border equalization provisions. I will have a few general comments later in my testimony on the relationship of the differing provisions that explain our position that even if the import and/or export provisions are included in greenhouse gas legislation, the cost-mitigating allowance-grant type provisions are still urgently needed.

With respect to the object of our focus, the cost-mitigation proposals, good progress is being made and a convergence is emerging—much of this reflected in the legislation introduced late last year by Congressmen Inslee and Doyle, the "Carbon Leakage Prevention Act"— key provisions of which, as indicated above, are under consideration by Mr. Doggett. Such provisions fit well with bills that focus on tax credit mechanisms as well as more traditional cap-and-trade structures.

II. Good Progress Is Being Made—We Support the Inslee-Doyle Output-Based-Rebate Type Solution, Subject to Further Work on the Eligibility Mechanism and Other Issues. We Urge the Trade Subcommittee and Full Committee to Consider Including Similar Provisions in the Committees' Global Warming Legislation.

The legislation Congressmen Inslee and Doyle introduced last year, H.R. 7146, represents the core of a workable solution, and we support its approach. It is not perfect from our point of view and we know it is not final. It should be noted that it certainly does not negate all of the cost that would be imposed by cap and trade legislation on trade-vulnerable, energy-intensive manufacturers. It is appropriately neither a categorical exemption nor a complete elimination of compliance costs. Likewise, it is structured to be transitional relief that keeps American businesses competitive until global agreement can be reached. We are working with the congressmen and other stakeholders to refine it further.

There remain important issues we believe must be addressed. Chief among them is the manner in which last year's bill dealt with selection by EPA of eligible industries. We believe that Congressmen Inslee and Doyle are reworking this section, and we are very hopeful that a new provision will make the process more certain, more objective and more data driven. In any event, I discuss our eligibility concern and a potential solution in more detail later in my testimony (Section IV). I would also note that among the other important issues that merit further attention are the fact that the allowances would not be sufficient to cover the full amount of the costs at issue and the amount of discretion to

reduce or eliminate the program. I also note that the Dingell-Boucher discussion draft released last year adopted much of the Inslee-Doyle structure as it existed at the time, along with some changes that we think helped advance the thinking of all of us on the leakage problem.

Moreover, I want to stress the "convergence" that we are seeing. In the Senate, those members who have worked most intensely on the issue, such as Senators Brown and Stabenow (as reflected in their amendment in Senate consideration of the Lieberman-Warner bill), as well as many of those in the environmental and academic communities who have studied the issue, USCAP, and others, are not only supporting allowance-grant relief to energy-intensive, trade-exposed industries, they are supporting key structural elements that also undergird the Inslee-Doyle approach. The most important of these is basing allocations on actual output as opposed to historic or grandfathered levels and incorporating an efficiency standard into the allocation formula.

III. Key Features of the Inslee-Doyle Output-Based-Rebate Solution.

In essence, the Inslee-Doyle solution, like the Brown-Stabenow solution in the Senate, is a cost-mitigating program that (*i)* grants free allowances *or rebates allowance value* to energy-intensive trade-exposed industries to compensate them for (*ii)* a significant portion of the direct allowance and increased electricity costs of a cap-and-trade regime, (*iii)* that varies the grant based upon a facility's actual, not historic, output, (*iv)* that rewards a facility for carbon efficiency and punishes it for inefficiency though use of a benchmark or efficiency standard, and (*v)* that phases out only as international agreements solve the underlying cost disparity.

I will not discuss each of these features in detail, but I do want to note a few of their most important aspects.

A. Output-Based Allotments

The Inslee-Doyle mechanism provides for output-based allotment of allowances. Most of the early anti-leakage, cost-mitigating provisions based their allocation of allowances on a facility's historic emissions. This raised a number or problems, including the following two.

First, historic or grandfathered emissions approaches provide a disincentive to increase production and also discourage new-firm entry—and lost production opportunities in the U.S. may result in production of the same goods elsewhere. An historic-based allocation would not mitigate the cost of additional production. Additional production would be fully exposed to the cost of allowances. Hence, the mechanism would do nothing to help energy-intensive industries to expand production and add jobs. At risk, for instance, would be added production to supply steel, aluminum, copper, glass, ceramics, fiberglass, etc. to what we all hope will be increased production of green products, from wind turbines to solar panels. Similarly, American suppliers would be

less likely to be providing the cement, plate glass or fiberglass going into new construction of energy-efficient buildings or renovations of older inefficient ones.

Second, some believe historic-based allocations—but not output-based allocations—may in some instances produce an incentive to raise prices but not production. To some commentators this strange phenomenon is a function of "opportunity cost." In some (limited) circumstances, a producer may be able to obtain higher prices, or fail to pass through the cost savings occasioned by free allowances, by in essence saying that if it does not receive from its customers an incremental return on its allowance-grant asset it will reduce production and sell the freed-up allowance. In other words, the existence of this opportunity to sell the allowance changes the seller's supply curve. *In any event, basing the allowance grant on actual output solves this problem—to the extent it exists— by removing the "opportunity" to sell an unused allowance*. A facility only gets an allowance for a product it produces.

Output-basing has another big advantage. It facilitates the use of a benchmark or efficiency standard. A facility's actual production can be included in a formula with an efficiency standard to determine the number of allowances granted.

B. Efficiency Standards

As I described earlier, energy-intensive, trade-exposed industries already have a compelling economic incentive to become energy efficient, which, in turn, leads them to be carbon efficient. That incentive has resulted in remarkable production innovations and efficiency gains. Nonetheless, some policy makers have sought additional assurances that anti-leakage provisions will further incentivize emissions reductions.

Last year's Inslee-Doyle legislation provided this through the use of an effective and practical benchmark: the average energy efficiency of a sector or subsector. This standard has the advantage of being both relatively easy to determine, by definition achievable, and constantly increasing over time. Companies above the average would do relatively better and those below relatively worse, creating an added incentive for each group to improve its efficiency—and thus raising the average. This mechanism inherently rewards operational efficiency and therefore creates a lasting incentive for continuous innovation and technological development.

So, we support the efficiency standard in Inslee-Doyle as introduced last year. We are very concerned, however, about some changes proposed to it. Some would seek to replace the sector-average standard with a "best practices" standard. It would be impossible for companies facing the threat of leakage, or legislators assessing policy options, to know at this juncture whether that which would be deemed by EPA to be the "best practice" in a sector or subsector is economically feasible, or, for that matter, reasonably available.

If it were not, the leakage relief afforded by the allocation grant provision could be illusory. For example, while paper mills use biomass as fuel, many are also coal-fired.

A coal-fired paper plant in Maine, for example, might be forced to close if EPA determined that gas combustion or biomass was the "best practice." And, the jobs lost in all likelihood would not move to a gas-fired plant in the U.S., but, rather, to foreign producers. A best practices regulatory regime is a very different animal than a cap and trade scheme, and attempting to combine the two is very likely a bridge too far. We would strongly oppose it.

C. Direct and "Indirect" Costs

The Inslee-Doyle provision compensates for some, but not all, of the costs that would be imposed by cap and trade legislation. I believe it is important to understand the compromise it represents in this respect.

The costs imposed on U.S. manufacturers by greenhouse-gas legislation will be both those that result directly from their obligation to buy and submit allowances (or under a carbon tax to pay the tax) and "indirectly" from higher prices for electricity, feedstocks, and other production inputs. Moreover, the cost of natural gas, as one example, is likely to increase far more than the cost of allowances associated with its combustion because of the effect of fuel substitution that will drive up the demand for natural gas and because of a shift in the demand curve for natural gas that results precisely from its carbon advantage.

A true cost-*negating* anti-leakage provision would address all indirect as well as direct costs. The Brown-Stabenow amendment in the Senate attempted to take this approach. The Inslee-Doyle cost-*mitigation* approach does not. It would compensate for the increased cost of purchased electricity, but would not compensate for cost increases of feedstocks/inputs, nor would it compensate for the demand and demand-curve caused increases in natural gas. Additionally, Inslee-Doyle imposes an across–the-board 15 percent reduction on its reimbursed costs, direct and indirect—compensating, that is, for only 85 percent of those costs. This was done in part to reduce the grants awarded to a highly efficient producer as a result of the efficiency benchmark.

D. Termination Tied to International Solutions

If the allowance-grant program were to expire on a date certain, or decline on a fixed basis, leakage could re-emerge even after it appeared under control. In fact, because manufacturers need certainty and because they plan their capital allocation far in advance, an expiring anti-leakage provision may well tilt plant location decisions toward foreign locations without regulation. Moreover, a set expiration date would give other countries an incentive to drag their feet in negotiations—to wait us out.

Instead, targeted assistance to energy-intensive industries should be terminated only when the carbon leakage problem is solved through an international agreement. And, it should be phased down only in proportion to progress made in reducing the cost differentials between trading partners in a fashion that demonstrably reduces the disadvantage to domestic producers—not according to an arbitrarily defined timeline.

While further refinements are needed, the Inslee-Doyle proposal generally takes this approach.

IV. The Issue of "Qualifying" Industries or Sectors

The Working Group's major issue with the Inslee-Doyle Carbon Leakage Prevention Act as introduced last year concerned its procedures and standards for determining which sectors or subsectors would be eligible to receive allowances. The bill assigned this determination to the EPA subject to a set of criteria that left much room for interpretation and disagreement. In effect, EPA and manufacturers would have been subjected to a series of contested, forecast-rich procedures covering scores of manufacturing sectors and subsectors. These proceedings would be filled with questions of market and product definition as well as competitive impacts. The bill established a very uncertain process—and affected industries need some reasonable level of certainty in making capital expenditure decisions, decisions they must make even now. Similarly, members of Congress from manufacturing states need to know whether their industries will get relief or not.

By contrast, most of the other legislative proposals from last Congress, including the Lieberman-Warner bill, the Boxer substitute, the Brown-Stabenow amendment, and the Dingell-Boucher discussion draft, listed specific industries that would be eligible.

A middle way offering several advantages has emerged. It was suggested by an analysis of the European approach and the work of any number of organizations and scholars—for example, the work of the Peterson Institute and the World Resources Institute in their publication.[5]

Our Working Group has been actively engaged in providing analysis and ideas for this proposal, and it is likewise under consideration by Congressmen Inslee and Doyle. In brief, the provision establishes "presumptive" eligibility through a two-factor test, energy intensity measured by a ratio that sets energy costs over value of shipments and trade exposure measured by the value of imports and exports over the value of shipments plus imports. If a sector or subsector met the presumptive-eligibility standards, it would be eligible for allowances unless the Administrator found that it was not subject to substantial leakage. Any sector or subsector that did not meet the presumptive eligibility tests would be able to establish eligibility through a demonstration of the likelihood of leakage. The actual amount of allowances granted would be decided by the Inslee-Doyle formulas which focus on GHG emissions. The proposed eligibility methodology would make the process of designation of eligible sectors more certain, manageable, principled and data-driven.

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[5] Houser, Trevor, Rob Bradley, Britt Childs, Jacob Werksman, and Robert Heilmayr, *Levelling the Carbon Playing Field: International Competition and US Climate Policy Design,* May 2008.

V. Some Key Metrics: The FTI Study

Attached to this testimony is a summary of the results of a study by FTI Consulting. We believe and hope it will make an important contribution to analysis of the eligibility issues by all concerned. One of its principal contributions, we think, is to "disaggregate" the very broad categories of industries that had been studied by others and to examine the data at a six-digit North American Industrial Code System level. In addition, it applies objective energy-intensity and trade-intensity criteria to the broad range of American industry, identifying sectors or subsectors that should at least presumptively qualify for relief but that were not on the list most frequently identified. We invite and welcome comment on the study, and we will ask Rob Fisher of FTI to be available for those who wish to work with him.

The study examines the publicly-available trade, energy use, and sales revenue data and implements an energy-intensity threshold of 5 percent and a trade-exposure threshold of 15 percent to determine presumptive eligibility. Both of these standards are consistent with, but somewhat more conservative than, other work to date in the area. For instance, the 5 percent appears to be very near the standard applied by the Peterson/WRI analysis cited above and presents a stricter eligibility threshold than the 4 percent level cited by the recent Pew Congressional Policy Brief, "Addressing Competitiveness in U.S. Climate Change Policy." The study uses the same formula to determine a trade-exposure ratio as does the EU's regulatory scheme, but the study applies a stricter 15 percent trade-exposure compared to the EU's 10 percent.

The FTI study finds 40-plus sectors or subsectors that would qualify for presumptive eligibility, including the list commonly identified as most at risk and represented by our Working Group members. However, the study also identified smaller industries, largely overlooked to date, that meet the criteria and thus would be presumptively qualified. For example, nitrogenous fertilizer with an energy intensity of 14 percent and a trade intensity of 86 percent would qualify, as would wet corn milling, which includes corn sweeteners, at11 percent energy intensity and 20 percent trade intensity. The manufacture of refined beet sugar (7 percent energy intensity; 22 percent trade intensity) would qualify as well.

While the energy-intensity and trade-intensity data is relatively straightforward, figuring out the amount of emissions implicated takes considerable extrapolation, so the numbers that follow are approximate. In all, 45 industries are identified as presumptively qualifying (out of the 473 industries included among the NAICS industrial manufacturing codes). These represent about 8 percent of total direct U.S. emissions. When all of the emissions associated with their electricity consumption are included, these industries represent about 10.5 percent of total U.S. emissions. An allowance program that compensated them for the cost of their direct emissions and increased cost of electricity would require about 13 percent of allowances available, for example, under the Lieberman-Warner first year cap of 5,700 million ton CO2e cap in the first year. It should be noted that the 13 percent figure is a rough approximation and that it does not reflect industries that do not qualify for presumptive eligibility but successfully make

individuated showings. Moreover, the figure does not include allowances needed to cover production growth.

I should also note that while using data from six-digit NAICS codes to determine whether a sector or subsector would presumptively qualify provides an excellent balance of determinacy, accuracy and administrative ease, it does not work in every instance. Some energy-energy intensive and trade-intensive manufacturing facilities are not classified in six digit codes that meet the presumptive thresholds. For example manufacturers of ceramic substrates for catalytic converters and diesel particulate filters are classified in a NAICS code for auto parts that would not meet the standards. Yet, these manufacturers are energy- and trade-intensive and meet the thresholds on properly individuated data. These circumstances must be accommodated in designing a presumptive-qualification mechanism.

VI. The Relationship of Allowance Grants and Border Cost-Equalization Proposals

As indicated above, while our Working Group's focus has been solely on the Inslee-Doyle type allowance grants that seek to address the leakage problem by mitigating the cost impact of greenhouse gas regulation on energy-intensive and trade-exposed industries, most legislative proposals to date have included border equalization provisions as well. The details of the interface of the two provisions are critical. I wish to make just a few brief and general points about the relationship of the two.

Exports. First, most border equalization provisions suggested so far do not help U.S. manufacturers stay competitive in export markets, and because of the WTO prohibition on export rebates it is difficult to design a border equalization mechanism within a cap and trade structure that will ensure U.S. manufacturers maintain their competitiveness in export markets. Energy-intensive manufacturers are significant exporters. In fact, energy-intensive manufacturing accounts for approximately 14 percent of all U.S. exports. It is unwise to put these exports in jeopardy. This export problem can effectively be addressed through a system of free allowances or rebates without giving rise to a WTO challenge.

Downstream and "Green" Products. Second, border-equalization mechanisms are designed to allow energy-intensive manufactures to pass along the legislation-driven costs to their customers by raising the cost of materials imported into the U.S. by a comparable amount. This creates the troubling possibility that the downstream products could become less competitive as against products produced elsewhere. For instance, because the cost of a bottle is significant part of the cost of a beer or a bottle of wine, Mexican beer and Chilean wine would have a cost advantage over American beer and wines. By way of further example, and assuming the relevant downstream industry is not covered by a border adjustment mechanism, U.S. car assembly plants could be at a cost disadvantage relative to foreign car manufacturing locations that can buy their steel, glass, aluminum and ceramics outside the protective zone of the border equalization provision. This downstream-product phenomenon could be especially harmful to our

country's hopes of participating in the manufacture of "green products" such as wind turbines and solar panels. It should be noted that border rebate provisions within a VAT-tax-like context, which are directed at keeping American products competitive in export markets, likewise do not address this downstream cost problem.

Certainty. Lastly, allowance allocations to energy intensive industries are within our control, are not subject to serious legal challenge, are a feature of cap and trade regimes enacted to date including those in the EU and Australia, and are very unlikely to lead to retaliation or trade wars.

There is a role for WTO-compliant border equalization mechanisms, and perhaps other trade measures, where allowance grants are inadequate or unavailable, and, moreover, such mechanisms should be part of our negotiators' tools. They cannot, however, be the primary mode of relief for the pressing problem of the leakage of carbon and jobs presented by U.S. greenhouse gas regulation.

Mr. Chairman and members of the Subcommittee, thank you very much for this opportunity to appear before you.

ATTACHMENT A

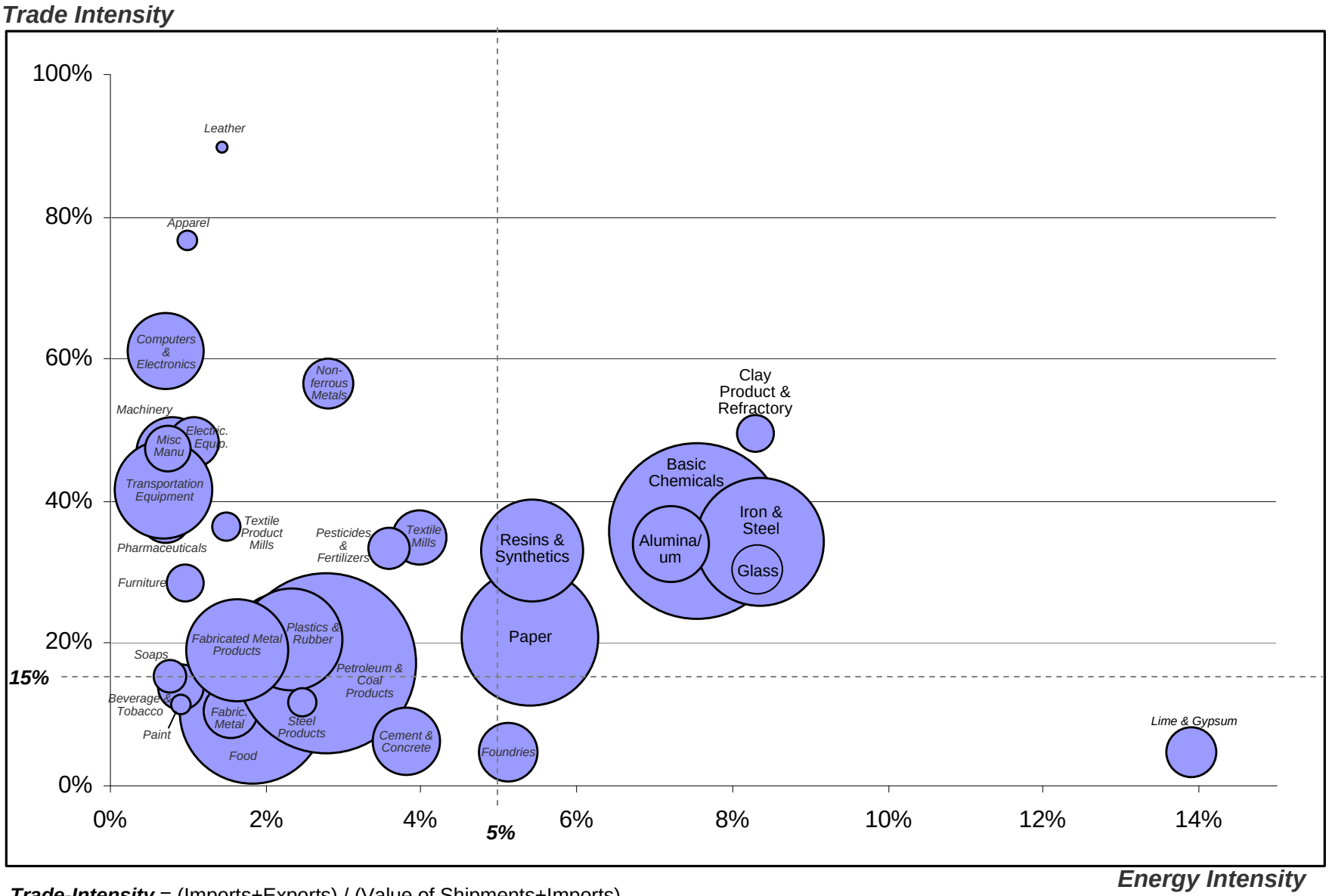
Greenhouse Gas Emissions Legislation
Leakage-Exposed Manufacturers

Briefing Book

March 24, 2009

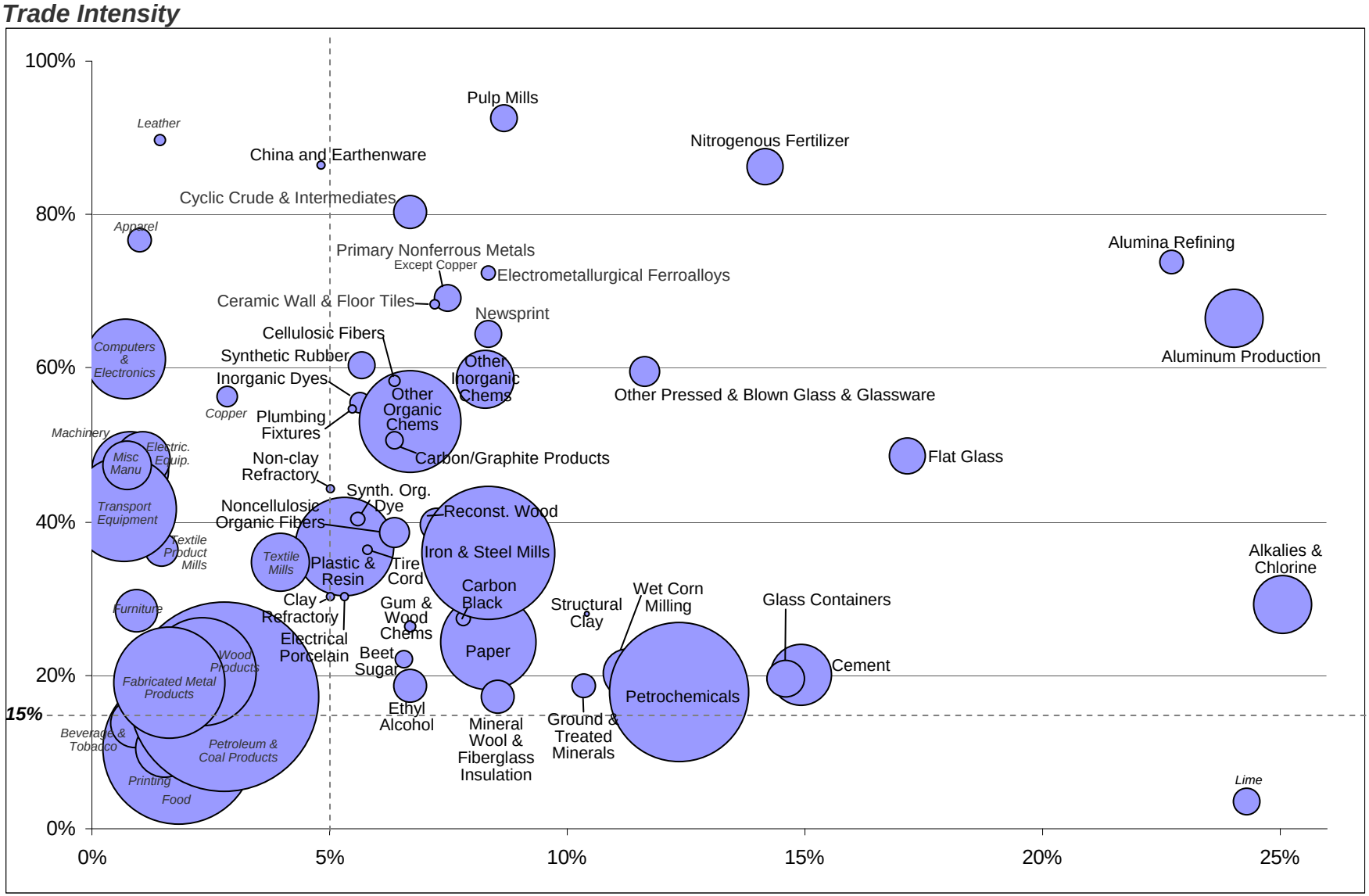
Rob Fisher
(202) 589-3408

US Manufacturing Leakage Exposure: Aggregate Level



Trade-Intensity = (Imports+Exports) / (Value of Shipments+Imports)
Energy-Intensity = (Energy & Fuel Costs + Generation) / Value of Shipments
Size of Bubble = Amount of energy and fuel consumed as proxy for emissions
Sources: US Census 2006 Annual Survey of Manufacturers, EIA 2002 MECS, US International Trade Commission Tariff & Trade DataWeb

US Manufacturing Leakage Exposure: Detailed Industry Level



Trade-Intensity = (Imports+Exports) / (Value of Shipments+Imports)
Energy-Intensity = (Energy & Fuel Costs + Generation) / Value of Shipments
Size of Bubble = Amount of energy and fuel consumed as proxy for emissions
Sources: US Census 2006 Annual Survey of Manufacturers, EIA 2002 MECS, US International Trade Commission Tariff & Trade DataWeb

Leakage Exposure

To identify the manufacturing industries that are the most highly exposed to this leakage issue, we calculated the energy intensity and trade intensity of each manufacturing sub-industry (at the 6-digit NAICS code).

Methodology for Calculating Energy-Intensity and Trade-Intensity

- We first calculated the energy intensity of each industry. The primary data source we used was the most recent Annual Survey of Manufacturers (ASM) from the US Census, which includes data for 2004-2006. From the ASM we calculated the costs of purchased electricity and of purchased fuel as a percentage of the value of shipments.

- For export and import data, we relied on the US International Trade Commission's Trade Dataweb statistics for 2004-2006, which provides trade data at the 6-level NAICS level.

    - For Imports, we used the US Imports for Consumption category and within that category, we used the CIF Import Value.
    - For Exports, we used the Domestic Exports category. Within that category, we used FAS Value.

- Based on the work in other studies and on the EU's scheme, we have used two thresholds to determine those industries most exposed to leakage[2]:

    1) Energy intensity of **5%**
    2) Trade intensity of **15%**

- The maximum for the last three years of available data (2004-2006) was used to determine eligibility. So, for example, if an industry's energy intensity for the last three years respectively was 4%/5%/4%, it met the eligibility requirement.

[2] Ratios were rounded to nearest whole percentage point. For example, a calculated energy intensity of 4.51% or higher was rounded up to 5.0% and thus met the 5% threshold.

Methodology for Calculating Energy-Intensity and Trade-Intensity (continued)

- 41 industries met these two criteria.

- In addition, we included NAICS code 311210 (Iron and steel tube and pipe from purchased steel) in order to treat it the same for eligibility purposes as tube and pipe manufactured on an integrated basis.

- We added NAICS code 212210 (Iron ore mining and processing) to capture the beneficiation and other processing for similar reasons – to treat products the same for eligibility purposes whether they are produced at an integrated or non-integrated facility.

- To determine eligibility for the copper industry, we combined the energy and trade data for NAICS codes 331411 (Primary smelting and refining) and 212234 (Copper and nickel mining) to properly capture all copper processing whether the beneficiation of ore occurs at an integrated or non-integrated facility.

- A product that meets the energy intensity and trade intensity criteria should be considered eligible even if the facility that produces it is classified in a non-qualifying NAICS code by virtue of the facility's other products or the facility's ultimate product.

Qualifying Manufacturing Industries

Sectors	NAICS	Sub-Industry	Leakage-Intensity		Value of Shipments
			Energy Intensity	Trade Intensity	
Pulp, Paper & Newsprint Mills	322110	Pulp mills	**9%**	**92%**	4
	322121	Paper (except newsprint) mills	**8**	**24**	47
	322122	Newsprint mill products	**8**	**64**	4
Basic Chemicals	325110	Petrochemicals	**12**	**18**	66
	325131	Inorganic dyes and pigments	**6**	**55**	4
	325132	Synthetic organic dyes and pigments	**6**	**40**	3
	325181	Alkalies and chlorine	**25**	**29**	6
	325182	Carbon black	**8**	**27**	2
	325188	All other basic inorganic chemicals	**8**	**58**	19
	325191	Gum and wood chemicals	**7**	**26**	1
	325192	Cyclic crude and intermediates	**7**	**80**	9
	325193	Ethyl alcohol	**7**	**18**	8
	325199	All other basic organic chemicals	**7**	**53**	69
	325211	Plastics material and resins	**5**	**37**	79
	325212	Synthetic rubber	**6**	**60**	7
	325221	Cellulosic organic fibers	**6**	**58**	1
	325222	Non-cellulosic organic fibers	**6**	**38**	7
Nitrogenous fertilizer	325311	Nitrogenous fertilizer	**14**	**86**	4
Ceramics/Porcelain	327111	Vitreous china plumbing fixtures	**6**	**55**	1
	327112	Vitreous china and earthenware articles	**5**	**86**	1
	327113	Porcelain electrical supplies	**5**	**30**	1
	327122	Ceramic wall and floor tiles	**7**	**69**	1
	327123	Other structural clay products	**10**	**28**	0.2
	327124	Clay refractory	**5**	**30**	1
	327125	Non-clay refractory	**5**	**44**	1
Glass Production	327211	Flat glass	**17**	**48**	3
	327212	Other pressed and blown glass and glassware; incl. optical fiber	**12**	**59**	4
	327213	Glass containers	**15**	**20**	4
Cement	327310	Cement	**15**	**20**	11
Fiberglass	327993	Mineral wool	**9**	**17**	6
Iron & Steel	331111	Iron and steel	**8**	**36**	92
	331112	Electrometallurgical ferroalloy products	**8**	**72**	1
	331210	Iron and steel pipe and tube from purchased steel			10
	212210	Iron ore mining and beneficiation	**18**	**54**	2
Alumina/um	331311	Alumina refining	**23**	**74**	1
	331312	Primary aluminum production	**24**	**66**	6
Copper	331411	Primary smelting and refining of copper	**6**	**71**	10
	212234	Copper and nickel mining and beneficiation			
Other Industries	311221	Wet corn milling	**11**	**20**	10
	311313	Beet sugar	**7**	**22**	3
	314992	Tire cord and tire fabric mills	**6**	**34**	1
	321219	Reconstituted wood products	**7**	**39**	8
	327992	Ground or treated minerals and earth	**10**	**19**	3
	331419	Primary nonferrous metal (except copper and aluminum)	**8**	**69**	5
	335991	Carbon and graphite products	**6**	**50**	2

Trade-Intensity = (Imports+Exports) / (Value of Shipments+Imports)
Energy-Intensity = (Energy & Fuel Costs + Generation) / Value of Shipments
Sources: US Census 2006 Annual Survey of Manufacturers, EIA 2002 MECS, US International Trade Commission Tariff & Trade DataWeb
EPA -- Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2006
Note: Percentages are rounded to nearest percentage point

Qualifying Industry Descriptions

NAICS	NAICS Name	Description
311221	Wet corn milling	Wet milling corn and other vegetables (except to make ethyl alcohol) to make such products as corn sweeteners (eg, glucose, dextrose, and fructose); corn oil; and starches (except laundry)
311313	Beet sugar	Refined sugar from sugarbeets
314992	Tire cord and tire fabric mills	Cord and fabric of polyester, rayon, cotton, glass, steel, or other materials for use in reinforcing rubber tires, industrial belting, and similar uses
321219	Reconstituted wood products	Reconstituted wood sheets and boards, such as waferboard, oriented strandboard and particleboard
322110	Pulp mills	Pulp manufacturers that do not make paper or paperboard; pulp is made by separating the cellulose fibers from the other impurities in wood or other materials
322121	Paper mills	Paper (except newsprint and uncoated groundwood paper) made from pulp; may also manufacture or purchase pulp
322122	Newsprint mill products	Newsprint and uncoated groundwood paper from pulp
325110	Petrochemicals	Acyclic (aliphatic) hydrocarbons (eg. ethylene, propylene, and butylene) and/or cyclic aromatic hydrocarbons (eg. benzene, toluene, styrene, xylene, ethyl benzene, and cumene) made from refined petroleum or liquid hydrocarbon
325131	Inorganic dye and pigments	Black pigments, except carbon black, white pigments, and color pigments.
325132	Synthetic organic dye and pigments	Includes lakes and toners (except electrostatic and photographic)
325181	Alkalies and chlorine	Chlorine, sodium hydroxide (i.e., caustic soda), and other alkalies often using an electrolysis process
325182	Carbon black	Carbon black, bone black, and lamp black
325188	All other basic inorganic chemicals	Basic inorganic chemicals (except industrial gases, inorganic dyes and pigments, alkalies and chlorine, and carbon black)
325191	Gum and wood chemicals	Wood or gum chemicals (eg, naval stores, natural tanning materials, charcoal briquettes, and charcoal, except activated) or Distillation of wood or gum into products (eg, tall oil and wood distillates)
325192	Cyclic crude and intermediates	Cyclic crudes or, cyclic intermediates (i.e., hydrocarbons, except aromatic petrochemicals) from refined petroleum or natural gas or the distillation of coal tars
325193	Ethyl alcohol	Nonpotable ethyl alcohol
325199	All other basic organic chemicals	Basic organic chemical products (except aromatic petrochemicals, industrial gases, synthetic organic dyes and pigments, gum and wood chemicals, cyclic crudes and intermediates, and ethyl alcohol)
325211	Plastics material and resins	Resins, plastics materials, and nonvulcanizable thermoplastic elastomers and mixing and blending resins on a custom basis and/or noncustomized synthetic resins
325212	Synthetic rubber	Synethetic rubber such as Styrene-Butadiene-Rubber (SBR), butyl, polychloroprene, and stereo polyisoprene elastomers
325221	Cellulosic organic fibers	Cellulosic (i.e., rayon and acetate) fibers and filaments in the form of monofilament, filament yarn, staple, or tow
325222	Non-cellulosic organic fibers	Noncellulosic (i.e., nylon, polyolefin, and polyester) fibers and filaments in the form of monofilament, filament yarn, staple, or tow
325311	Nitrogenous fertilizer	Production of fertilizer through inorganic (Synthetic ammonia, nitric acid, urea, and ammonium compounds) or organic sources
327111	Vitreous china plumbing fixtures	Vitreous china plumbing fixtures and china and earthenware bathroom accessories, such as faucet handles, towel bars, and soap dishes
327112	Vitreous china and earthenware articles	Table and kitchen articles, art and ornamental items, and similar vitreous china, fine earthenware, stoneware, coarse earthenware, and pottery products
327113	Porcelain electrical supplies	Porcelain electrical insulators, molded porcelain parts for electrical devices, ferrite or ceramic magnets, and electronic and electrical supplies from nonmetallic minerals, such as clay and ceramic materials
327122	Ceramic wall and floor tiles	Includes mosaic and quarry tiles
327123	Other structural clay products	Clay sewer pipe, drain tile, flue lining tile, architectural terra-cotta, and other structural clay products
327124	Clay refractory	Clay refractory, mortar, brick, block, tile, and fabricated clay refractories, such as melting pots. A refractory is a material that will retain its shape and chemical identity when subjected to high temperatures and is used in applications that require extreme resistance to heat, such as furnace linings.

Qualifying Industry Descriptions

NAICS	NAICS Name	Description
327125	Non-clay refractory	Nonclay refractory, mortar, brick, block, tile, and fabricated nonclay refractories such as graphite, magnesite, silica, or alumina crucibles.
327211	Flat glass	Flat glass made by melting silica sand or cullet (includes integrated facilities that also produce laminated glass)
327212	Other pressed and blown glass and glassware	Glass made by melting silica sand or cullet and products made by pressing, blowing, or shaping glass or glassware (except glass packaging containers); Also includes fiber optics
327213	Glass containers	Glass containers for commercial packing and bottling, and for home canning, including bottles and jars
327310	Cement	Portland, natural, masonry, pozzalanic, and other hydraulic cements; manufacturers may calcine earths or mine, quarry, manufacture, or purchase lime
327992	Ground or treated minerals and earth	Calcining, dead burning, or otherwise processing beyond beneficiation, clays, ceramic and refractory minerals, barite, and miscellaneous nonmetallic minerals
327993	Mineral wool and fiberglass insulation	Mineral wool and mineral wool (i.e., fiberglass) insulation products made of such siliceous materials as rock, slag, and glass or combinations thereof
331111	Iron and steel mills	Steel production, direct reduction of iron ore, manufacture of pig iron, conversion of pig iron into steel; includes both BOF and EAF; includes integrated facilities that also manufacture shapes (e.g., bar, plate, rod, sheet, strip, wire) or form tube and pipe
331112	Electrometallurgical ferroalloys	Ferroalloys add critical elements, such as silicon and manganese for carbon steel and chromium, vanadium, tungsten, titanium, and molybdenum for low- and high-alloy metals
331210	Iron and steel pipe and tube from purchased steel	Welded, riveted, or seamless pipe and tube from purchased iron or steel
212210	Iron ore mining and processing	Mine site development, mining, and/or beneficiation (i.e., preparation) of iron ores and manganiferous ores valued chiefly for their iron content and/or (2) sinter iron ore production (except iron ore produced in iron and steel mills) and other iron ore agglomerates
331311	Alumina refining	Alumina (i.e., aluminum oxide) refining generally from bauxite
331312	Primary aluminum production	Aluminum production from alumina; includes integrated facilities that also roll, draw, extrude, or cast the aluminum into primary forms (e.g., bar, billet, ingot, plate, rod, sheet, and strip)
331411	Primary smelting and refining of copper	Smelting of copper ore and/or the primary refining of copper by electrolytic methods or other processes to makeprimary copper and copper-based alloys, such as brass and bronze, from ore or concentrates
212234	Copper and nickel ore mining and beneficiation	Mine site development, mining, and/or beneficiation (i.e., preparation) of copper and/or nickel ores, and recovery of copper concentrates by the precipitation, leaching, or electrowinning of copper ore
331419	Primary nonferrous metals (except copper and aluminum)	Primary production of nonferrous metals by smelting ore and/or by electrolytic methods or other processes; includes lead, gold, silver, titanium, zinc and magnesium
335991	Carbon and graphite products	Carbon, graphite, and metal-graphite products including fibers, brushes and brush stock, and electrodes for thermal and electrolytic uses

Methodology for Estimating Emissions

After identifying the manufacturing industries exposed to carbon leakage, we then estimated the emissions for these qualifying industries to determine the scope of required allowances to address the issue. We estimated the 2007 emissions based on available EPA and EIA data. Since sufficient emissions data are not available at a sub-sector level, we needed to make certain assumptions based primarily on electricity and fuel use to estimate emissions for qualifying industries.

Emissions (EPA's Inventory of US Greenhouse Gas Emissions and Sinks: 1990-2007)[3]
(Million metric tons CO_2 Equ.)

	Fuel Combustion	Electricity	Industrial Processes	Other Emissions	Total
Total	3,350	2,397	328	992	**7,068**
Industrial	857	708			1,565
Manufacturing	802	614			1,416
Representative Industries	**391**	**222**	**158**		**771**
% of Total Emissions	5.5%	3.1%	2.2%		10.9%
% of 2012 Allowances *(Est. 5,775)*	6.8%	3.8%	2.7%		13.4%

- We started with the EPA 2007 emissions for the Industrial sector, broken out between combustion and electricity.
- Using the EIA's Annual Energy Outlook 2008, we calculated the percentage of Industrial emissions that Manufacturing represented for electricity (87%) and for consumption (94%).[4]

[3] The Total and Industrial rows are from the EPA, remaining data is derived
[4] The Industrial sector is Manufacturing plus Agriculture, Forestry, Fishing, Hunting, Mining and Construction

Methodology for Estimating Emissions (continued)

- The next step was to allocate the overall Manufacturing emissions to each sub-industry of the Manufacturing sector to determine how many emissions our qualifying industries represent. To allocate electricity emissions, we applied the percentage of purchased and generated kWhs of electricity (from the ASM) for each sub-industry to the overall electricity emissions figure (612 million) for Manufacturing.

- To estimate the consumption emissions, we started with the manufacturing consumption figure derived from the EPA (806 million). We used the EIA's 2006 paper[5] to determine the initial allocation percentages. We first added up the emissions for all the fuel sources and calculated the percentage of the total for each industry. Over 90% of the consumption emissions are allocated to an industry. We allocated to sub-industries where necessary based on the emissions data given and then based on the fuel spend. For the remaining 8.6%, we allocated to the other industries based on fuel spend.

- We assigned/allocated the process emissions from the EPA to the individual industries.

- Definitions of emissions categories:

    - Fuel Combustion: Fossil fuel combustion to generate heat, steam or electricity to power industrial processes

    - Electricity: Indirect emissions from purchased electricity

    - Industrial Processes: Byproduct or fugitive emissions of greenhouse gases from industrial processes not directly related to energy activities such as fossil fuel combustion

[5] Energy-Related Carbon Dioxide Emissions in US Manufacturing (November 2006; Mark Schipper)

Emissions for Qualifying Manufacturing Industries

(million metric tons CO_2 Equ.)

Manufacturing Industry	NAICS	Sub-Industry	Fuel Combustion	Electricity	Industrial Processes	TOTAL
Food	311221	Wet corn milling	14	6		19
	311313	Beet sugar	3	1		4
Textiles	314992	Tire cord and tire fabric mills	0	1		1
Wood Products	321219	Reconstituted wood products	2	4		6
Paper	322110	Pulp mills	2	1		3
	322121	Paper (except newsprint) mills	28	20		48
	322122	Newsprint mill products	2	2		3
Chemicals	325110	Petrochemicals	27	10	4	41
	325131	Inorganic dyes and pigments	1	1		3
	325132	Synthetic organic dyes and pigments	1	1		2
	325181	Alkalies and chlorine	11	14	2	26
	325182	Carbon black	5	1		5
	325188	All other basic inorganic chemicals	7	15		22
	325191	Gum and wood chemicals	1	0		1
	325192	Cyclic crude and intermediates	3	3		6
	325193	Ethyl alcohol	6	3		9
	325199	All other basic organic chemicals	52	24	6	82
	325211	Plastics material and resins	46	21		67
	325212	Synthetic rubber	2	1		3
	325221	Cellulosic organic fibers	1	1		1
	325222	Non-cellulosic organic fibers	3	4		7
	325311	Nitrogenous fertilizer	9	3	36	48
Non-Metallic Mineral Products	327111	Vitreous china plumbing fixtures	0.4	0.1		0
	327112	Vitreous china and earthenware articles	0.3	0.1		0.4
	327113	Porcelain electrical supplies	0.2	0.3		0.5
	327122	Ceramic wall and floor tiles	1	0		1
	327123	Other structural clay products	0.2	0.0		0.2
	327124	Clay refractory	0.3	0.2		0.5
	327125	Non-clay refractory	0.4	0.2		1
	327211	Flat glass	3	1	1	4
	327212	Other pressed and blown glass and glassware	2	2	0.4	4
	327213	Glass containers	3	2	1	6
	327310	Cement	29	8	45	82
	327992	Ground or treated minerals and earth	2	1		3
	327993	Mineral wool	2	3		5
Primary Metals	331111	Iron and steel	111	36	54	201
	331112	Electrometallurgical ferroalloy products	1	1		2
	331210	Iron and steel pipe and tube from purchased steel	1	1		2
	212210	Iron ore mining and beneficiation	3	4		8
	331311	Alumina refining	2	0.3	1	4
	331312	Primary aluminum production	4	17	7	28
	311411	Primary smelting and refining of copper	1	0.4		1
	212234	Copper and nickel mining and beneficiation	1	3		4
	331419	Primary nonferrous metal (except copper and aluminum)	1	3	4	7
Electrical Equipment	335991	Carbon and graphite products	0.5	1		1
			391	222	158	**771**

Fuel Combustion: Fossil fuel combustion to generate heat, steam or electricity to power industrial processes

Electricity: Indirect emissions from purchased electricity

Industrial Processes: Byproduct or fugitive emissions of greenhouse gases from industrial processes not directly related to energy activities such as fossil fuel combustion

Frequently Asked Questions

- Why use energy intensity rather than emissions?
  For purposes of identifying qualifying industries, as opposed to calculating the number of allowances to be awarded, energy spending arguably is a better metric than emissions to determine the financial impact to manufacturing industries of greenhouse gas legislation. For instance, firms may be impacted by the increases in the cost of natural gas that will be inversely related to natural gas's relative carbon intensity advantage. Any emissions metric also will depend on an assumed allowance price, which is difficult to estimate. In addition, emissions data is not readily available at a detailed industry level. There are 473 Manufacturing sub-industries (6-digit NAICS). No known resource provides emissions data, or even detailed fuel usage data from which emissions could be derived, at a level of detail anywhere close to that. In any event, energy spending serves as a reasonable proxy for emissions since combustion emissions are a function of the energy used, varying only by the mix of fuels.

- Why use the Census's ASM rather than EIA's MECS?
  The most recent data for the MECS Survey is from 2002 rather than from 2006 for the ASM. Additionally, the ASM provides data on a much more granular NAICS level than the MECS Survey does. For the 473 NAICS sub-industries (6-digit), MECS provides energy data for only 39 at the 5- or 6-digit level. ASM provides 2005 or 2006 energy data for 472 of the 473 industries (Petrochemicals is the only one with no data) at 5- or 6-digit level. We have validated our results against MECS and in the case of Petrochemicals, we used the MECS data.

- Why is Imports in both the numerator and the denominator of the trade intensity formula?
  The size of any US market in which a manufacturer competes equals Domestic Production + Imports, where Exports are a subset of Domestic Production. Using Imports in the denominator of the trade intensity formula keeps the ratio from exceeding 100%. Note: We have used the same ration that is used by the EU.

- How is the variability from year to year in energy intensity and trade intensity addressed?
  We used the maximum of the three years (2004-2006) for energy intensity and trade intensity, which minimizes situations where an industry may qualify one year and not another. However it should be noted that these metrics have very little variability from year to year. The average annual change in energy intensity is only 0.2%. The average annual change in trade intensity is only 3%.